projections used in the HSW EIS. The HSW EIS volumes from offsite generators have been verified with the generator sites and are thought to be more realistic than waste volumes analyzed in the WM PEIS. Finally, some of the data was used in the transportation-impact calculations, for example, transportation-accident statistics, have been updated from previous studies. This has led to small differences in impacts relative to the differences that arise from the waste-volume projections.

H.9 Effects of Transporting Solid Waste by Rail

The analyses in this appendix assumed that all of the onsite and offsite shipments of solid waste would be conducted using trucks over existing roads. It is possible that some of the shipments of solid waste and construction/capping materials could be transported by rail. Rail shipments generally result in lower impacts than truck shipments. These lower impacts for rail relative to truck shipping are documented in numerous EISs (DOE 2002a, 1997a, 1997b). Generally, rail shipments result in lower impacts than truck shipments for a variety of reasons:

- Rail payload capacity is substantially greater than truck. This results in fewer shipments which, in turn, results in lower transportation impacts.

- There are fewer people sharing a rail line than would be sharing the highway with truck shipments. This is somewhat offset by the lower average speeds for rail shipments, which increases the exposure time relative to truck shipments.

- When a rail shipment stops at a railyard, there are many other railcars that provide shielding between the shipping container and any people. This shielding results in lower radiation dose rates, and thus lower radiation exposures, to bystanders and people living in the vicinity of rail stops relative to truck stops.

- According to recent data in Saricks and Tompkins (1999), fatality rates for truck and rail transport are comparable. For example, the nationwide accident and fatality rates for truck shipments are about 3.2E-7 accidents per truck-km and 1.4E-8 fatalities per truck-km, respectively (see Table 4 of Saricks and Tompkins [1999]). For rail shipments, the comparable nationwide accident rate is about 5.4E-8 accidents per railcar-km and the fatality rate is about 2.1E-8 fatalities per railcar-km (see Table 6 of Saricks and Tompkins [1999]). Although the fatality rate on a per-km basis is higher for rail than for truck shipments, the rail shipments travel fewer miles than truck shipments due to the higher payload capacity of the rail shipments. The higher payloads for rail shipments more than offset the difference in fatality rates, resulting in lower non-radiological accident impacts for rail shipments.

While rail shipments generally result in lower radiological incident-free and non-radiological accident impacts than truck shipments, the impacts of radiological accidents are likely to be higher for rail shipments than truck shipments. Recall that radiological accident impacts are calculated as the product of the frequency of an accident times its consequences. While the probability of a severe accident is comparable between the two modes as discussed above, the consequences of a severe rail accident would be greater due to the higher payload of rail shipments relative to truck shipments; i.e., larger quantities of radioactive materials would be released from a rail shipment than a truck shipment. This leads to generally higher radiological accident impacts for rail shipments relative to truck shipments. However, a review of the impact estimates in Table H.10 indicates that radiological accident impacts are a small fraction of the radiological incident-free and non-radiological impacts. Therefore, the radiological accident impacts do not contribute substantially to the total impacts.

Although predicted impacts for rail shipments would likely be smaller than for truck shipments, a number of other variables must also be considered. First, general freight rail service is slower than truck shipping, resulting in longer travel times and possibly long stop times in rail yards waiting for train makeup. The longer shipping times for rail shipments may also lead to less efficient use of DOE shipping containers, depending on the waste types transported by rail and the truck/rail mix of the shipping campaigns. Second, not all generator sites, including Hanford, are provided with rail service. In order for these sites to use rail service, they would have to construct new rail lines, rebuild existing lines that have been discontinued, or implement truck/rail intermodal transportation (i.e., deliver truck shipments to a railyard where the shipping containers would be offloaded from the trucks and loaded onto a rail car for subsequent transport; the opposite operation would be required if the receiving site is also not provided with rail service). This could lead to increased costs as well as increased impacts due to the additional handling activities required to offload and reload the containers onto or off of the railcars. Third, if a rail accident involving a derailment were to occur, the rail line could be disabled for a lengthy period of time. Although truck accidents could also involve closure of a highway, there is a greater potential for a detour around a closed highway than around a closed rail line.

There are two types of rail service available for radioactive waste shipments; 1) general freight rail in which the railcars carrying the wastes would be added to an existing train and 2) dedicated rail service in which a train would be made up solely of railcars carrying radioactive wastes to/from Hanford plus locomotives and buffer cars as needed. According to DOE (2002), dedicated rail service offers advantages over general freight rail service in incident-free transport but could lead to higher accident impacts. It was concluded in DOE (2002) that available information does not indicate a clear advantage for the use of either general freight or dedicated train service.

A final point relative to rail shipping is that the HSW management facilities are not currently provided with rail service. Although restarting rail service to the Waste Treatment Plant is currently under consideration, new rail spurs and upgrades to existing rail lines would be needed to reach the HSW treatment facilities. At this time, it is too speculative to assume that rail access to solid waste management facilities on the Hanford Site would be available, and an analysis of rail transport does not appear warranted.

H.10 References

10 CFR 71. "Packaging and Shipping of Radioactive Materials." U.S. Code of Federal Regulations. Online at: http://www.access.gpo.gov/nara/cfr/waisidx_01/10cfr71_01.html.

65 FR 10061. "Record of Decision for the Department of Energy's Waste Management Program: Treatment and Disposal of Low-Level Waste and Mixed Low-Level Waste; Amendment of the Record of Decision for the Nevada Test Site." *Federal Register* (February 25, 2000).